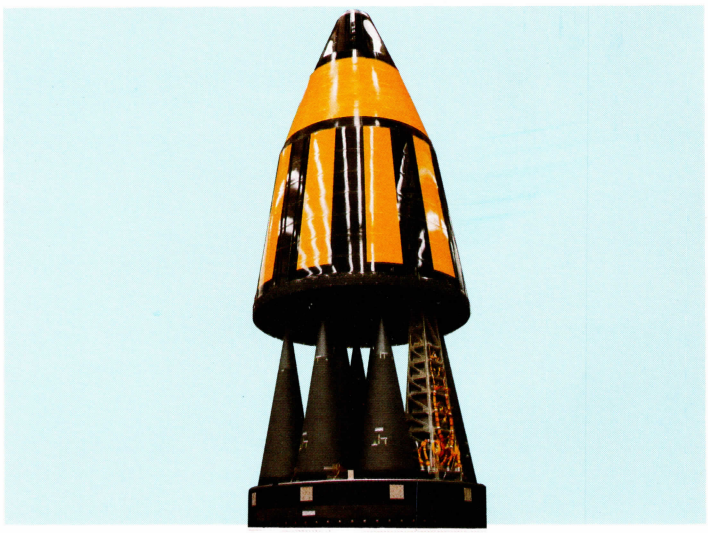
MX REENTRY SYSTEM

Avco Systems Division, under the direction of the U.S. Air Force Ballistic Missile Office, is responsible for the design, integration, test and evaluation of the MX Reentry System. The MX missile system is the nation's next generation intercontinental ballistic missile. The reentry system consists of a shroud, deployment module, 10 reentry vehicles (RV's) and associated electronics which together with the MX missile guidance and control system provide targeting, fuzing, ordnance initiation and deployment signals for the RVs. The shroud provides aerodynamic shaping for the MX missile and protection against launch environments during atmospheric ascent.

The MX missile is a mobile, four-stage rocket designed to partially replace the existing fixed silo-based Minuteman force which is becoming vulnerable to possible USSR Intercontinental Ballistic Missile (ICBM) first strike attack. Significant advances by the Soviet Union in the guidance technology, and deployment of multiple independently targeted reentry vehicles (MIRV's) have been incorporated into their ICBM force. Today the Soviet land-based MIRVed ICBM force is indeed formidable with deployment of 300 SS-19's carrying 6 RV's, 150 SS-17's carrying 4 RV's and 308 SS-18's carrying up to 10 RV's. The SS-18 is about twice the size of MX and has the potential for approximately twice the throw weight. This Soviet force is in place. The MX is scheduled for its first flight test early in 1983 and initial operational capability in late 1986.



MX MISSILE

REENTRY SYSTEM
(AVCO)

REENTRY VEHICLE
(AVCO)

GUIDANCE & CONTROL
(AUTONETICS)

AIRS GUIDANCE
(NORTHROP)

STAGE IV
(ROCKETDYNE)

STAGE III
(HERCULES)

STAGE II
(AEROJET)

STAGE I
(THIOKOL)

THROW MASS .....7,900 LBS.
MISSILE MASS .....191,600 LBS.
LENGTH.....70.9 FT.
DIAMETER .....92 IN.

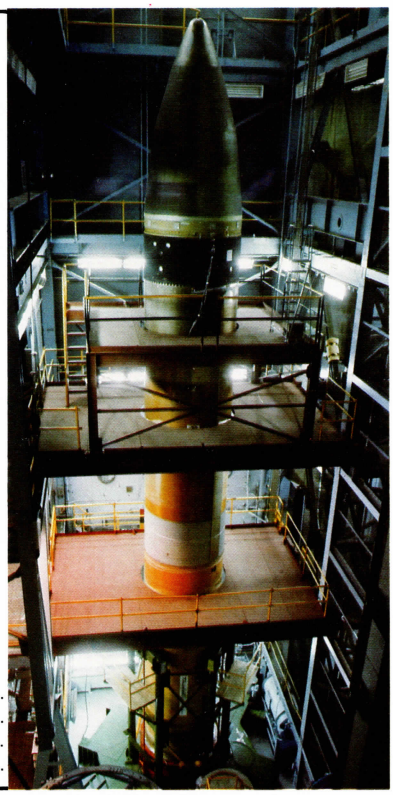


PHOTO COURTESY OF MARTIN MARIETTA

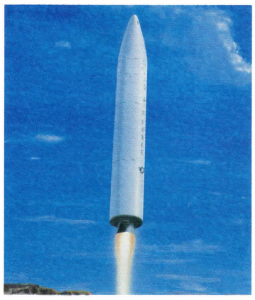
REENTRY SYSTEM INTEGRATION.....AVCO
SHROUD.....AVCO
- NOSE CAP, STAINLESS STEEL .....SPINCRAFT
- ROCKET, MOTOR.....ATLANTIC RESEARCH
- STRUCTURE, TITANIUM, TRI-CONIC.....GRUMMAN
- THERMAL SHIELD, ALUMINUM.....AVCO
- SHROUD SEVERING DEVICE, LSC .....AVCO

DEPLOYMENT MODULE.....AVCO
- STRUCTURE, GRAPHITE EPOXY COMPOSITE .....GENERAL DYNAMICS
- ELECTRONICS (D.M.E.) .....AVCO
- ORDNANCE INITIATION SET .....THIOKOL
- RV TIE DOWN BOLTS.....OEA

REENTRY VEHICLES
- MK 21 RV's .....AVCO

FLIGHT TEST EQUIPMENT
- INSTRUMENTATION & FLIGHT SAFETY SYSTEM (IFSS) .....MARTIN
- IFSS ANTENNA .....BALL BROTHERS

AVCO
SYSTEMS DIVISION



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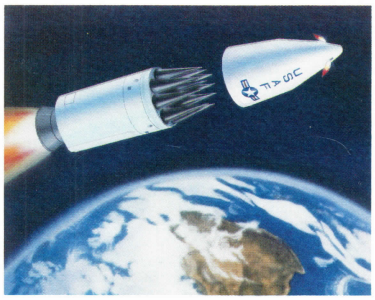

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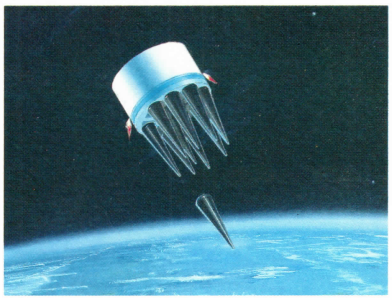

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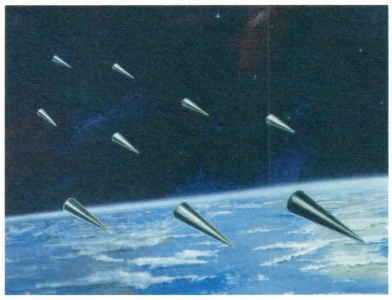


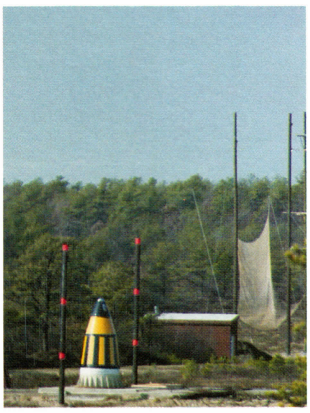
4.

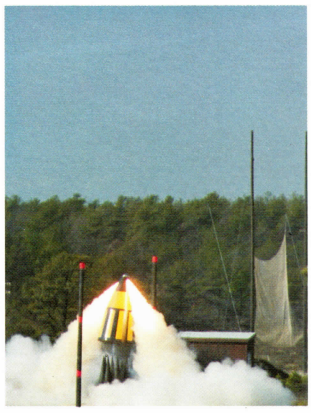
1. The first, second and third stage rockets propel the missile through the earth's atmosphere. 2. Shortly after third stage ignition the shroud is severed from the deployment module and propelled out of the missile flight path by a rocket motor mounted in the nose. 3. After third stage shutdown and separation, the fourth stage propulsion, guidance and control system maneuvers the deployment module containing the 10 RV's to attain the precise release attitude and velocity required to insert one of the RV's on its intended ballistic trajectory. The RV is "soft" released and the fourth stage is backed away. A gas generator is fired to spin stabilize the RV in its proper attitude during ballistic flight in preparation for reentry. The fourth stage then repeats the above maneuvers for each of the remaining 9 RV's. 4. Final warhead arming is performed during reentry, and detonation altitude for each RV is determined by the arming and fuzing system based upon preset target characteristics.

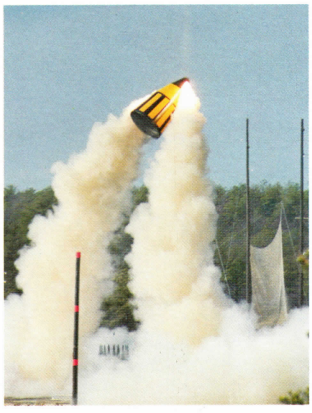
Recently, the MX Reentry System passed two major test milestones at Avco as it proceeds along full scale engineering development.

The first milestone was a successful electrical/mechanical fit check of the upper portion of the MX missile which included the third stage from Hercules, the fourth stage by Rockwell's Rocketdyne Division and the reentry system from Avco.

The second milestone was a shroud separation and flyaway test including the MX reentry system with simulated RVs in place. This heavily instrumented test was performed at Otis AFB, Cape Cod, Massachusetts where Avco maintains a field test facility. The sequence began when the shroud's connection to the deployment module was severed with a linear shaped charge followed by ignition of the tractor motor in the nose of the shroud. The motor propelled the shroud about 180 feet into the air and about 380 feet laterally due to the cant of the two exhaust ports. This was to ensure the shroud pulled away from the missile's continuing flight path. In operation the shroud typically would be removed at an altitude of 330,000 ft. during third stage burn.







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